FNCE 100 – FALL 2009 – MACKINLAY

Note Title 9/25/2009

Solutions – Interest Rate Exercises

1. $r_{a,365} = .0109$ annual rate compounded daily two year term

$$R = \frac{r_{a,365}}{365} = \frac{.0109}{365} \doteq .00002986$$

$$(1+r) = (1+R)^{365}$$

$$= (1.00002986)^{365}$$

$$= 1.010959$$

$$\Rightarrow r = \underline{1.10\%}$$

2. $r_{a,365} = .0134$

$\boxed{\text{\# days in 3 years}} \to 1095$

$$\text{Value of \$25000 in 3 years} = 25000 \times \left(1 + \frac{r_{a,365}}{365}\right)^{1095}$$

$$= 25000 \times \left(1 + \frac{.0134}{365}\right)^{1095}$$

$$= 25000 \times 1.04102$$

$$= \underline{\underline{\$\,26025.45}}$$

3. Value of \$15000 in 2 years $= 15000 \times \left(1 + \frac{.0109}{365}\right)^{730}$

$$= 15330.59$$

Value of \$15000 in 5 years $= 15000 \times \left(1 + \frac{.0183}{365}\right)^{1825}$

$$= 16437.21$$

r = annual yield required at time 2 to have same ending value <This is the forward rate $f_{3,2}$>

$$15330.59 \times (1+r)^3 = 16437.2$$

$$(1+r)^3 = 1.07218$$

$$1+r = 1.0235$$

$\rightarrow$ annual yield needed $= 2.35\%$ (3-year rate).

4. $r_{a,12} = .06$ $\quad R = \frac{r_{a,12}}{12} = \frac{.06}{12}$

$= .005$

$(1+r) = (1+R)^{12} = (1.005)^{12}$

$= 1.06168$

$r = \underline{6.17\%}$

use annuity to get payment

$$PV = C\left[\frac{1}{R} - \frac{1}{R(1+R)^{120}}\right]$$

$$100000 = C\left[\frac{1}{.005} - \frac{1}{.005(1.005)^{120}}\right]$$

$\Rightarrow C = 1110.21$

monthly payment is $\underline{\underline{\$1110.21}}$